



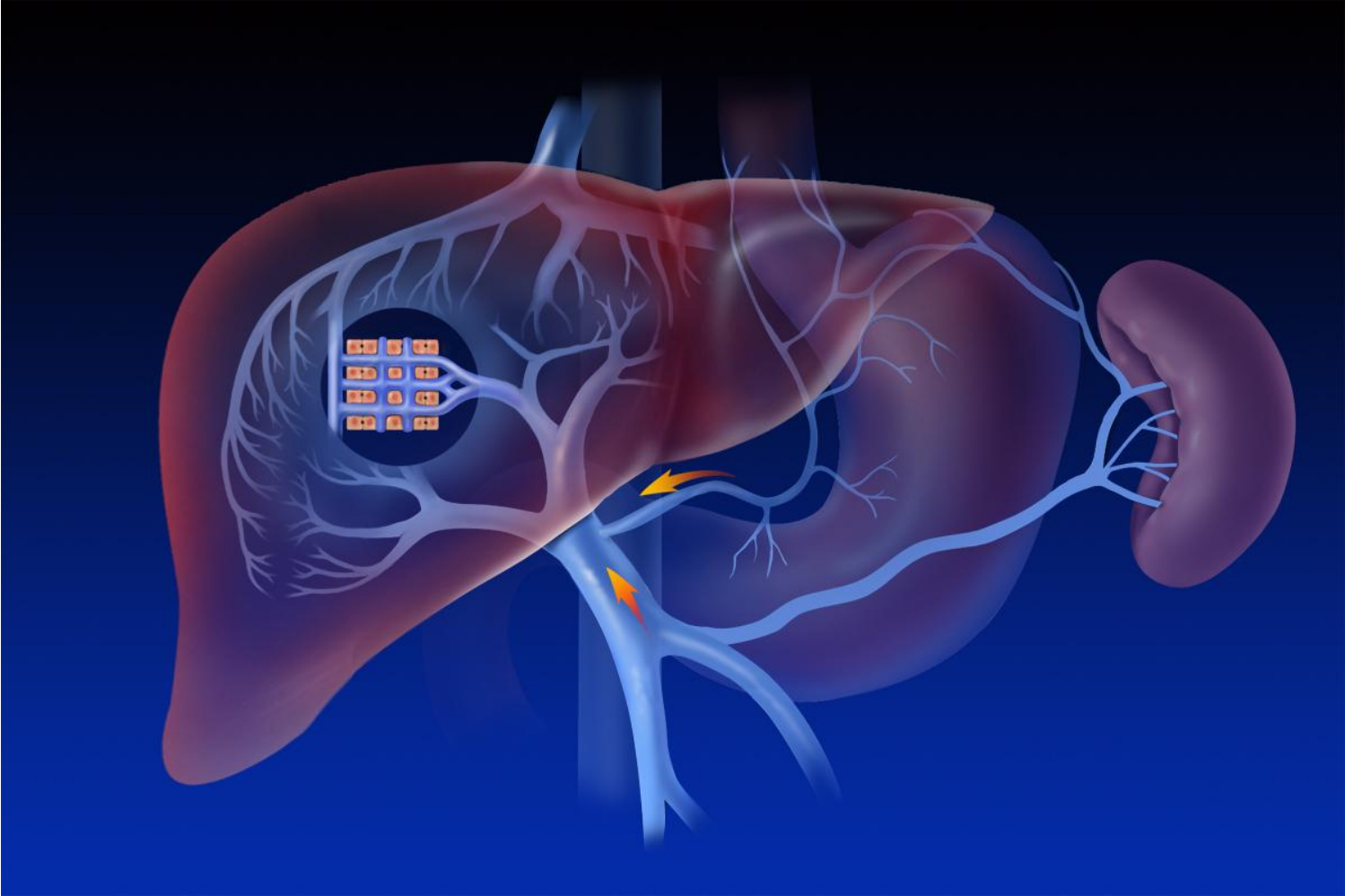
Decompensated Cirrhosis Varices, Ascites, and Hepatic Encephalopathy

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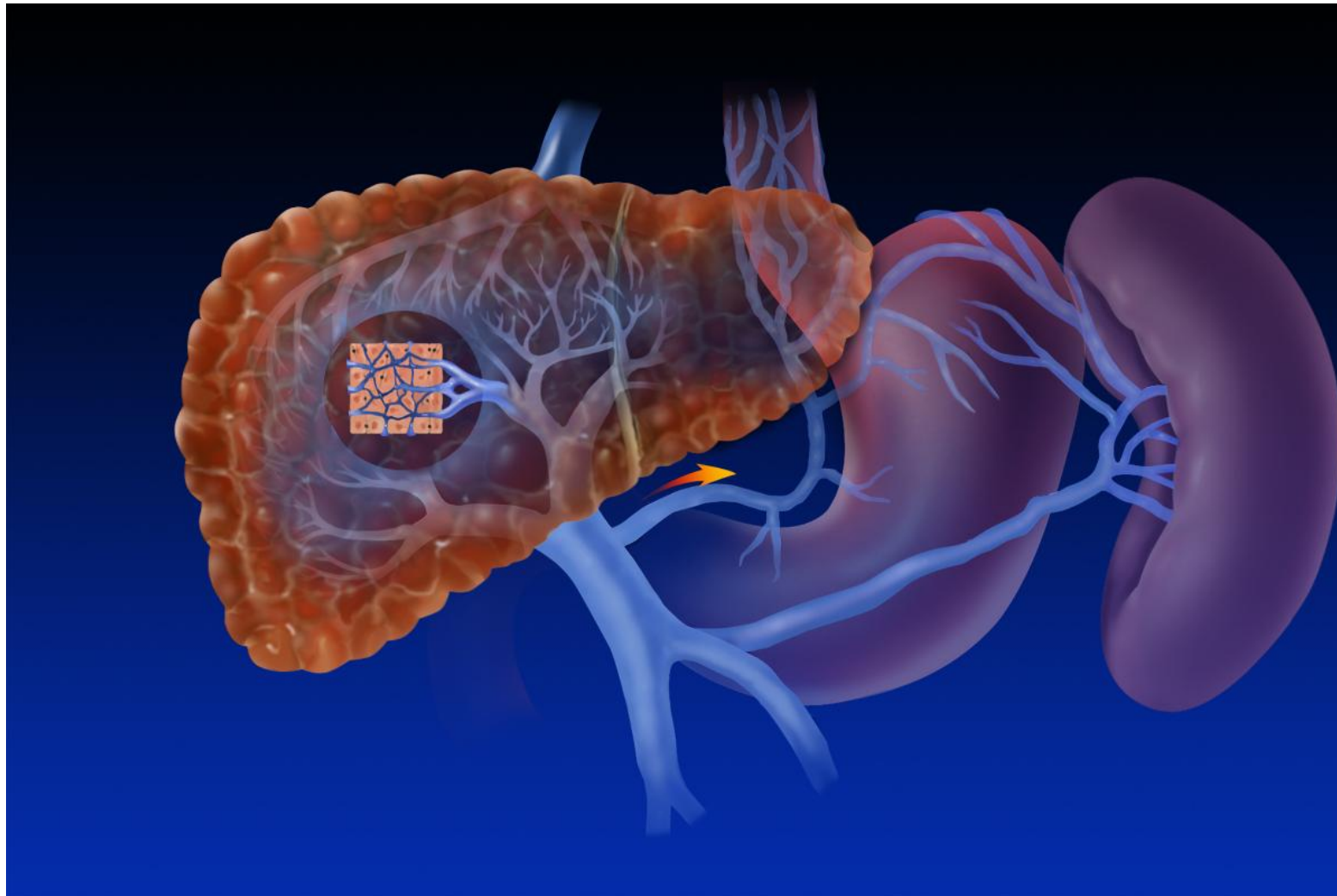
Learning Objectives

- Apply an evidence-based approach to the acute management, secondary prophylaxis, and surveillance of patients with esophageal varices
- Develop a stepwise management plan for cirrhotic ascites, including diuretic therapy, paracentesis, and TIPS
- Implement a management strategy for hepatic encephalopathy, use of lactulose and rifaximin, and strategies for prevention of recurrence

Normal Vasculature



Portal Hypertension

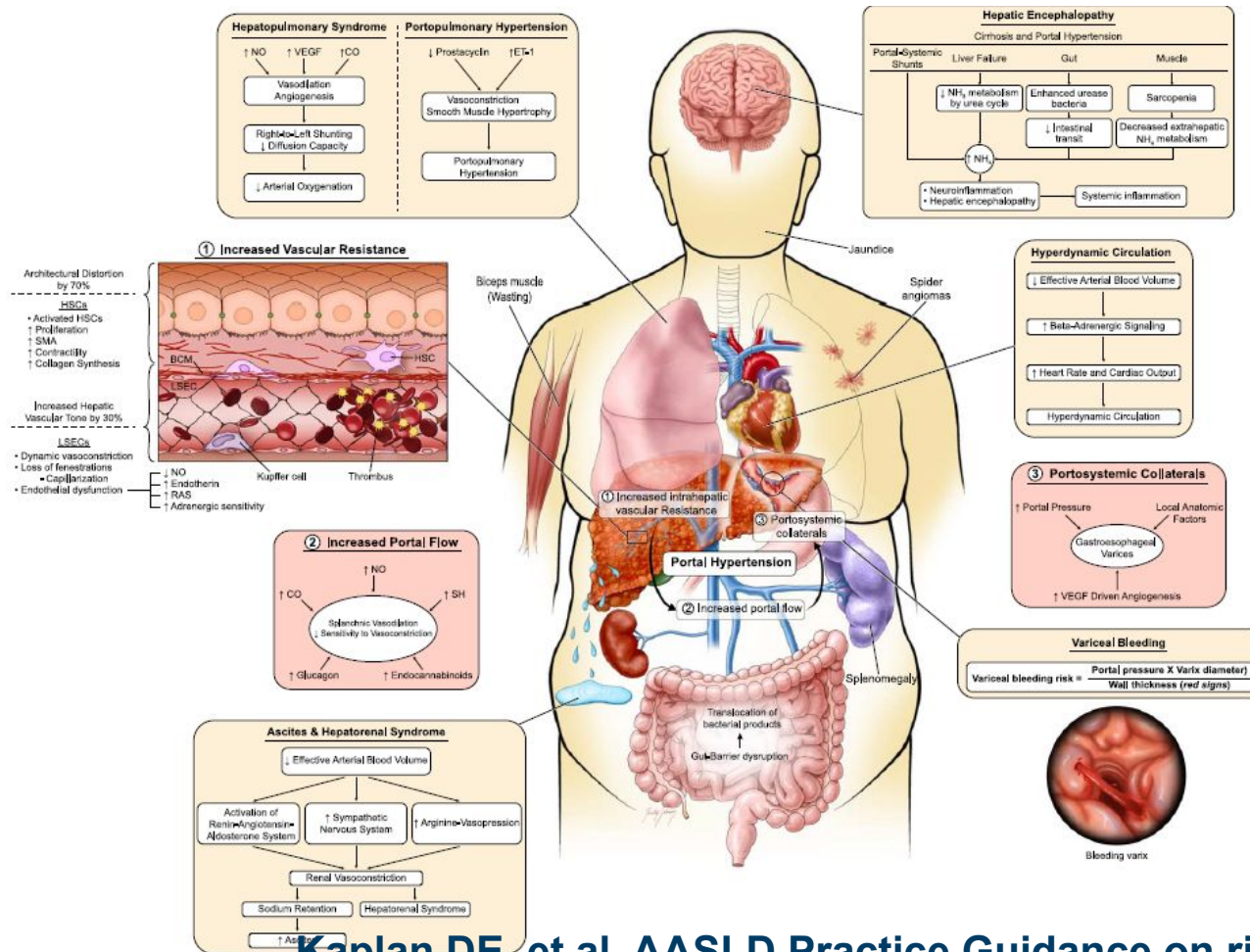


Recognizing Cirrhosis

- Eyes
 - Icteric sclera
- Skin
 - Jaundice, spider angiomas, palmar erythema, edema
- Abdomen
 - Caput medusa, ascites, hepatomegaly, splenomegaly
- Other
 - Clubbing, testicular atrophy, gynecomastia, asterixis



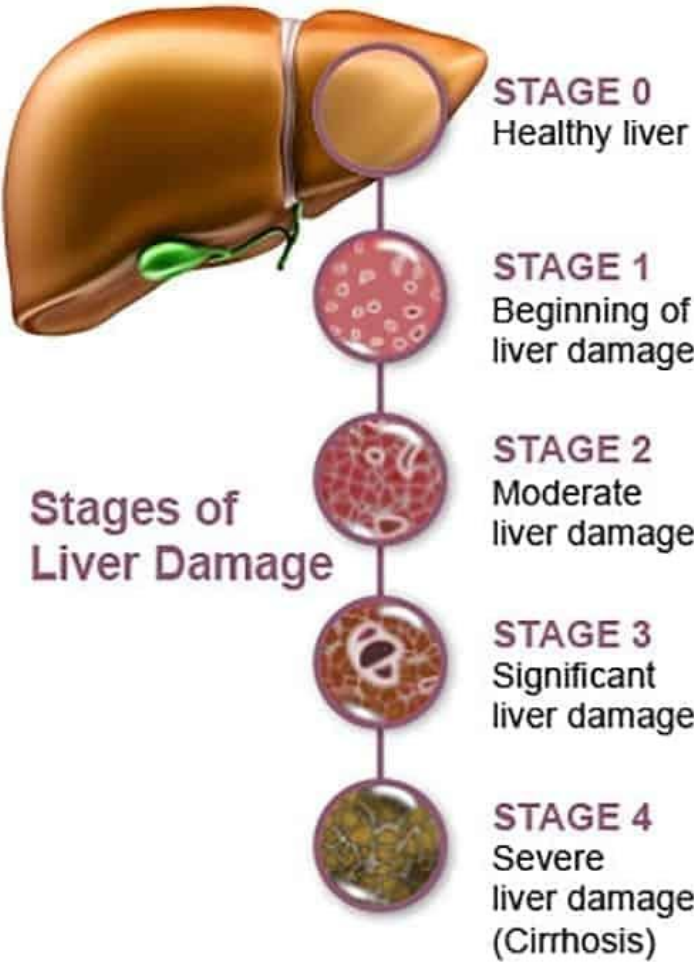
Effect of Liver Disease on the Body



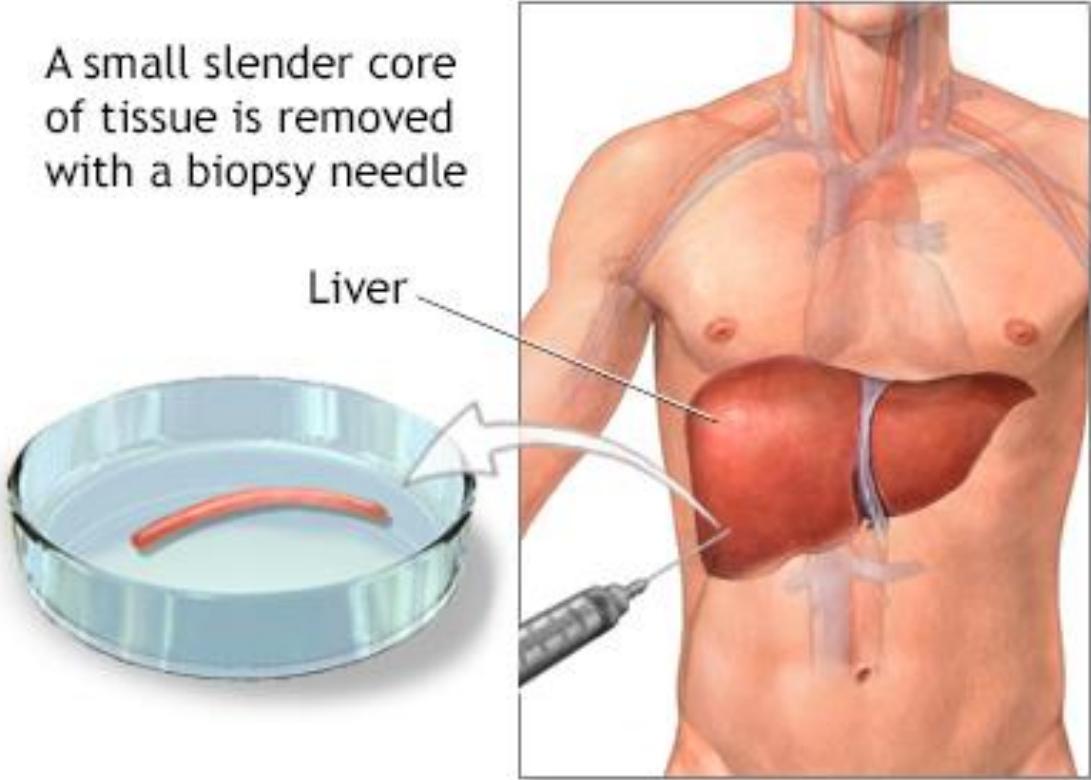
- Hepatic Encephalopathy
- Ascites
- Varices
- Hepatopulmonary Syndrome
- Hypotension
- Hepatorenal Syndrome
- Coagulation

Kaplan DE, et al. AASLD Practice Guidance on risk stratification and management of portal hypertension and varices in cirrhosis. *Hepatology*. 2024 May 1;79(5):1180-211.

Stages of Liver Disease



A small slender core of tissue is removed with a biopsy needle



ADAM.

Consensus Definition of Decompensation

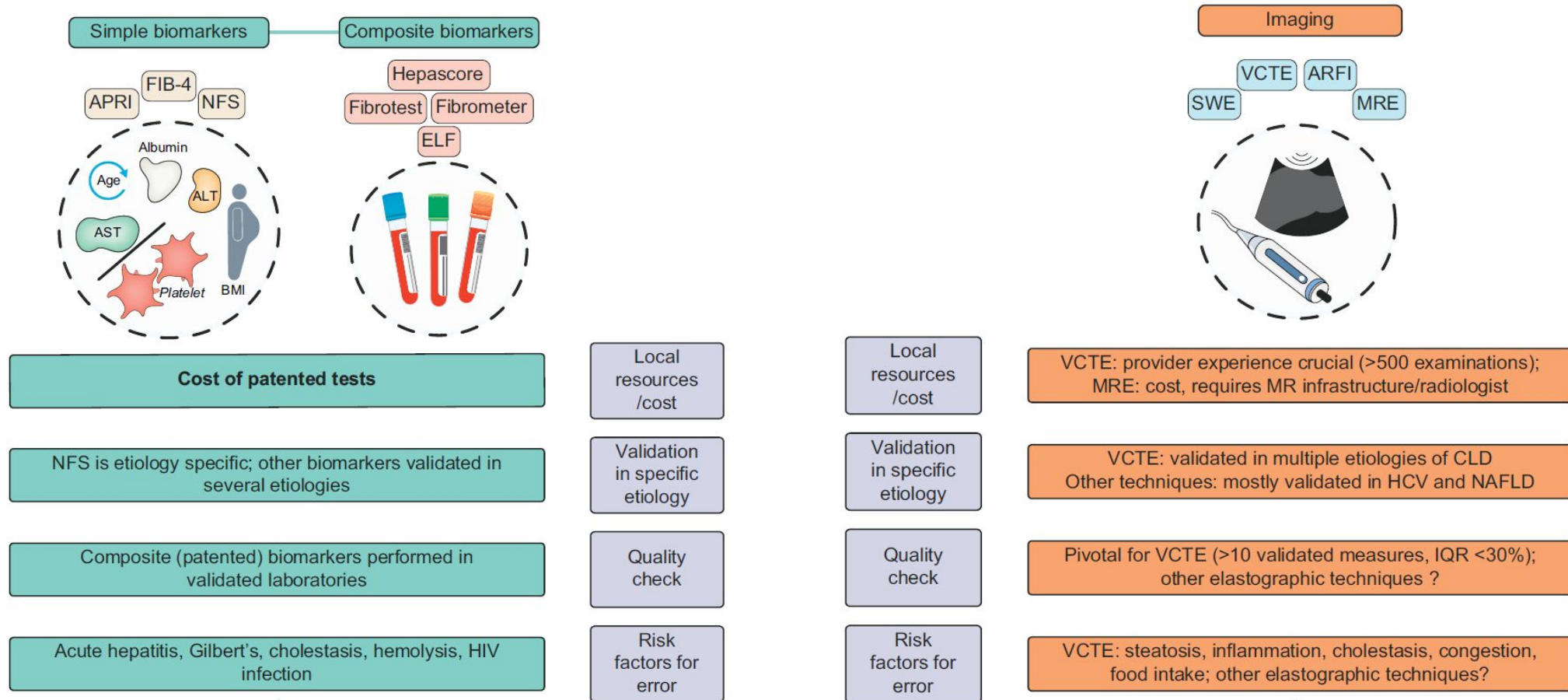
- Varices – Blood Vessels under Portal Pressure
- Ascites – Fluid under Portal Pressure
- Hepatic Encephalopathy – Brain Dysfunction

- ACLD – advanced chronic liver disease
- cACLD – compensated advanced chronic liver disease
- CSPH – clinically significant portal hypertension
 - ❑ High Portal Pressure > 10mmHg

Non-Invasive Ways to Measure Fibrosis

- Serum Biomarkers
- Use readily available tests
- Use patented tests
- Easily reproduced
- Performed as an outpatient
- Validation studies?
- All populations?
- FIB4
- Imaging
- Reproducible
- User friendly
- Limited availability
- Costly equipment
- VCTE – Fibroscan
- SWE – US with Elastography

Non-Invasive Ways to Measure Fibrosis



Patel, Keyur, and Giada Sebastiani. "Limitations of non-invasive tests for assessment of liver fibrosis." JHEP Reports 2.2 (2020): 100067.

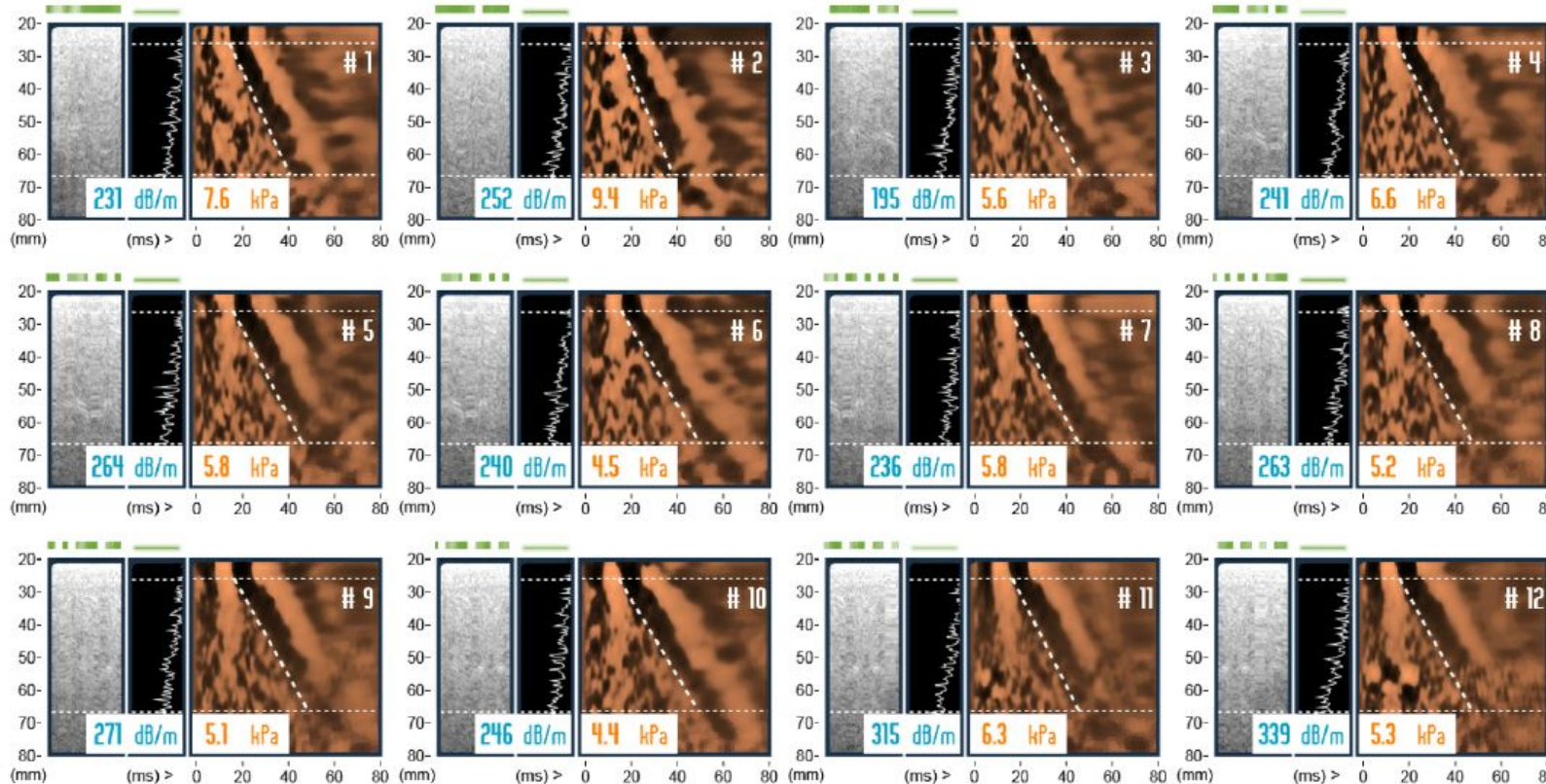
Vibration-Controlled Transient Elastography



Exam M (Liver)
 Operator : slf
 Valid measurements : 12
 Total measurements : 20
 SWS MEDIAN = 1.38 m/s
 SWS IQR = 0.15 m/s

- At least 10 valid measurements
- CAP elevated in steatosis
- Stiffness is 5.7kPa

No cirrhosis!



Stages of Chronic Liver Disease

Stages of chronic liver disease	No cirrhosis	Compensated cirrhosis		Decompensated cirrhosis	
		Lower risk of decompensation	Higher risk of decompensation	First decompensation	Further decompensation
Clinical features (ascites, VH or HE)	None	None	None	One event	>1 event or complication of event*
Histological diagnosis	F0-F2	F3/F4 (thin septa)	F4 (thick septa)	Clinical	Clinical
Hemodynamic features (HVPG mmHg)	3-5	5-10	>10 (CSPH)	>20 worse outcomes in VH	>20 worse outcomes in VH
Endoscopic features	None	No varices	± Varices	± Varices	± Varices

Risk of death

Kaplan DE, et al. AASLD Practice Guidance on risk stratification and management of portal hypertension and varices in cirrhosis. *Hepatology*. 2024 May 1;79(5):1180-211.

“Rule of 5” in Non-invasive Testing for Cirrhosis

Non-invasive staging of chronic liver disease	No cACLD	Possible cACLD	Highly suggestive of cACLD	cACLD	
Liver stiffness (kPa)	<10	10-15	15-20	20-25	>25
Platelet count (K/mm ³)	NR	NR	If <110 = CSPH	If <150 = CSPH	CSPH**

Risk of decompensation

- Non-invasive measures like Vibration Controlled Elastography
- Elastography or Fibroscan of the liver

Kaplan DE, et al. AASLD Practice Guidance on risk stratification and management of portal hypertension and varices in cirrhosis. *Hepatology*. 2024 May 1;79(5):1180-211.

Varices

Case Presentation

- 56M history of alcohol use disorder
- Developed cirrhosis
- Presented to hospital with hematemesis
- Meds – None
- Soc Hx – Still actively using ETOH
- PE – BMI – 25, Temp – 37, Pulse – 100, BP – 84/52
- Abd – Spider angiomas, dried blood around mouth, no distention in abdomen, A & O x 3
- Labs – Hgb – 8.1, Plts – 54, Na – 128, Cr – 1.1, T. Bili – 3.6, INR – 1.9 (MELD = 19)

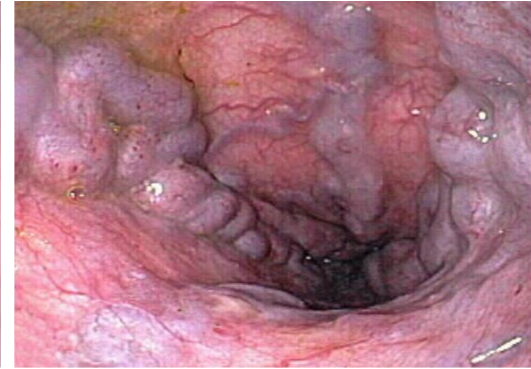
Varices Overview



No varices



Small varices



Large varices

Occurs in 50% of cirrhotic patients
10-30% bleed per year
30-50% mortality with bleeding

Beta Blockers?

- Older studies associated mortality risk with beta blockers and refractory ascites – mostly disproven
- Limiting factor is hypotension and kidney dysfunction
- Carvedilol is now preferred agent
 - Intrinsic anti-alpha 1 adrenergic activity
 - Release of nitric oxide – intrahepatic vasodilation
 - More potent to reduce portal pressure than other NSBB

Carvedilol Uses

- NOT for use in all cirrhosis, just in CSPH
 - Do not titrate to heart rate
 - Initial dose is Carvedilol 3.125mg po BID and increase as tolerated
1. CSPH – prevent clinical decompensation and avoid EGD
 2. Low risk varices AND no history of bleeding
 3. High risk varices / History of bleeding need Carvedilol in addition to EGD with Banding

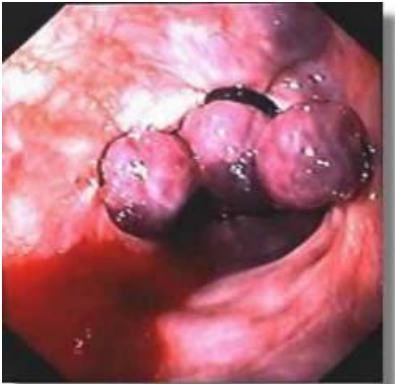
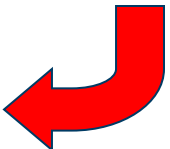
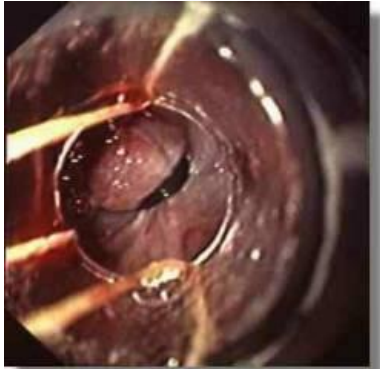
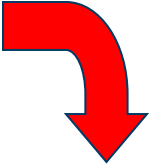
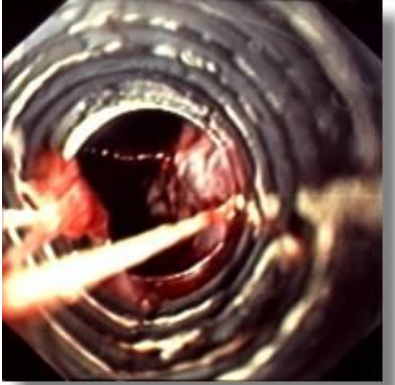
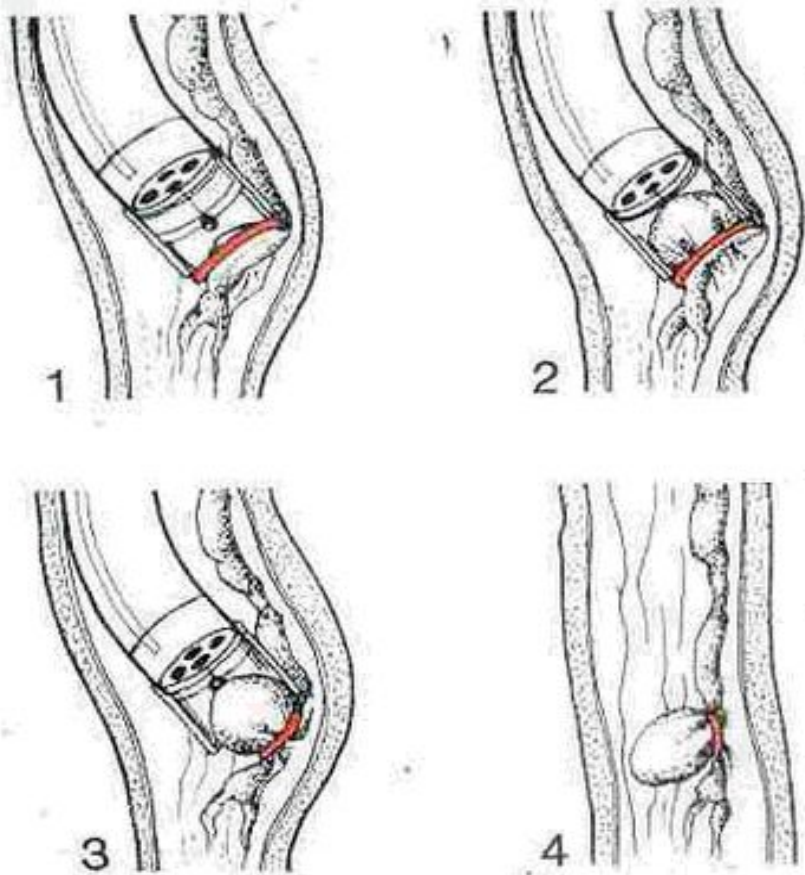
Kaplan DE, et al. AASLD Practice Guidance on risk stratification and management of portal hypertension and varices in cirrhosis. *Hepatology*. 2024 May 1;79(5):1180-211.

Villanueva C, et al. β blockers to prevent decompensation of cirrhosis in patients with clinically significant portal hypertension (PREDESCI): A randomised, double-blind, placebo-controlled, multicentre trial. *Lancet*. 2019;393:1597–608.

Do All Cirrhosis Patients Need an EGD?

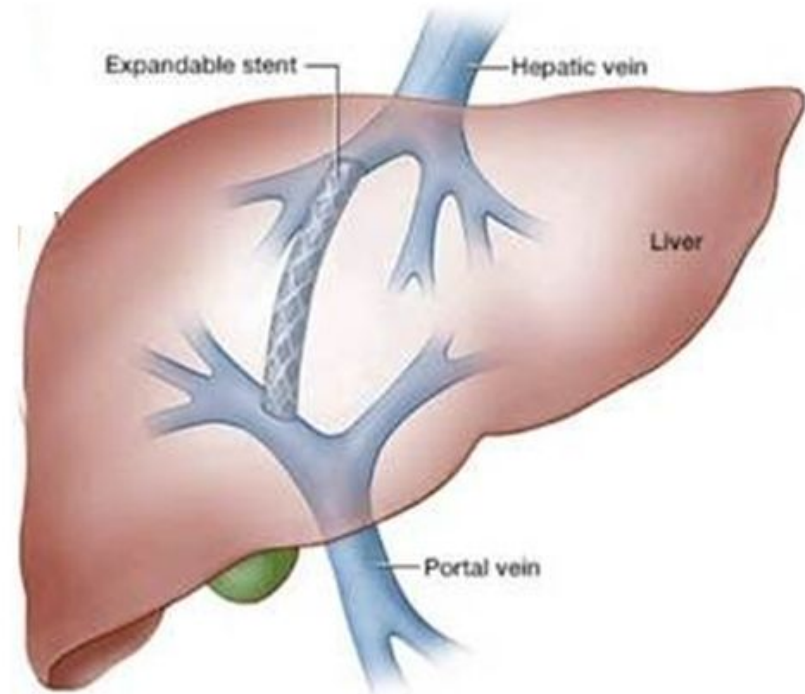
- NO
- Baveno Consensus Conference has new recommendations
 - ❑ Liver Stiffness Measurement (Elastography) is less than 20kPa
 - ❑ Platelet Count is $> 150k$ (normal)
- No EGD is needed
- Chances of varices is very low
- Re-evaluate with Elastography and Platelet Count yearly

Endoscopic Band Ligation

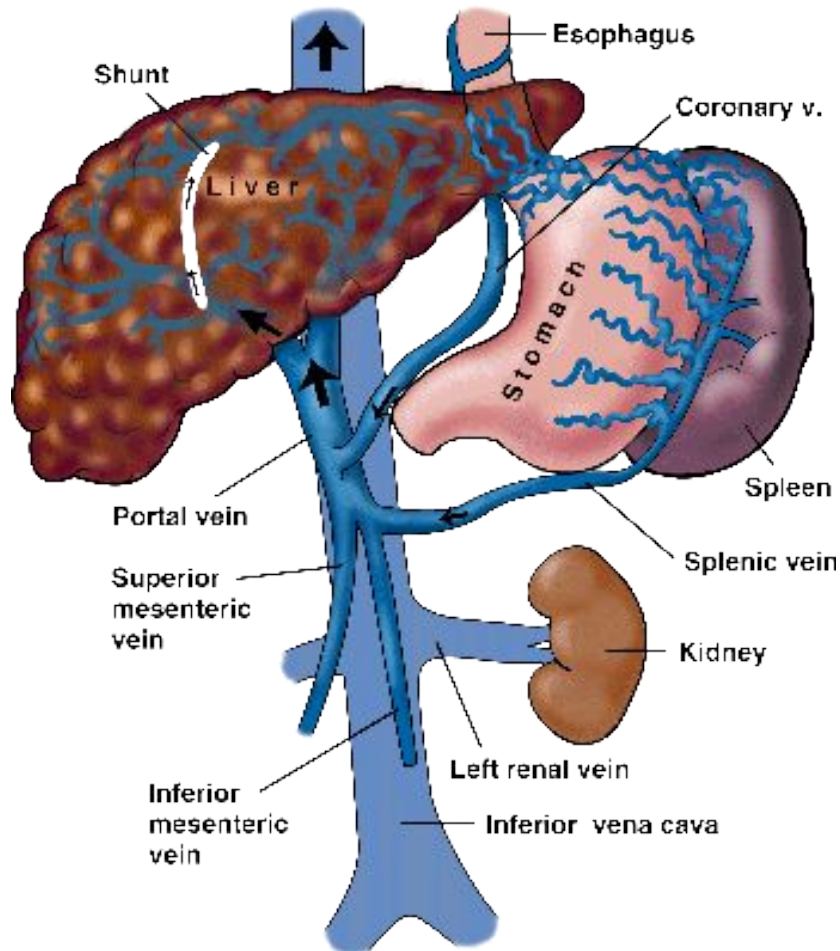


When Banding Does Not Work: TIPS

- Indications:
 - ❑ Portal Hypertension
 - ❑ Acute Bleed
 - ❑ Refractory to Medical Management
- Contraindications
 - ❑ Hepatic Encephalopathy
 - ❑ MELD > 18
 - ❑ Right-sided Heart Failure



Transjugular Intrahepatic Portosystemic Shunt



- Provides a path of less resistance
- Bypasses any detoxification of liver
- Major side effect - encephalopathy

Back to the Case Presentation

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- Labs – Hgb – 8.1, Plts – 54, Na – 128, Cr – 1.1, T. Bili – 3.6, INR – 1.9 (MELD = 19)

Questions About the Case...

1. Do you think this is a variceal bleed?
2. What is the right scope to choose for banding, if indicated?
3. For bleeding varices, what is the proper treatment plan for this patient?

Ascites

Case Presentation

- 38F moved to Virginia from California
- Alcohol use disorder history and cirrhosis
- Ascites developed 1 year ago, No confusion, No GI bleeding
- Meds – Furosemide, Spironolactone
- Soc Hx – Former smoker, Quit ETOH with cirrhosis diagnosis
- PE – BMI – 17, Temp – 37.3, Pulse – 95, BP – 102/63
- Abd – Spider angiomas, shifting dullness, no asterixis
- Labs – Hgb – 9.2, Plts – 64, Na – 131, Cr – 1.8, T. Bili – 2.2, INR – 1.4 (MELD = 19)

Prognosis of Ascites

- Within 10 years of cirrhosis – 70% of patients
- Eventually 10% will develop refractory ascites
- Leads to poor quality of life
 - Bloating
 - Immobility
 - Anorexia
 - Repeated procedures
- First line of therapy – Salt Restriction, Fluid Restriction
- Use of diuretics – Furosemide and Spironolactone

Management of Ascites – 2nd Line Therapy

- Na restriction
- Free water restriction
- Large volume paracentesis
- Transjugular intrahepatic portosystemic shunt (TIPS)
- Liver transplant



Large Volume Paracentesis – Safety?

- On average 4-6L removed
- Ensure albumin is given for $> 5L$ removed
 - Guidelines 6-8g of albumin / liter removed
 - Albumin if tenuous renal function
 - Albumin more effective than other IV fluids/agents
- INR > 1.5 and Platelet count < 50
 - Bleeding still only 1%



TIPS

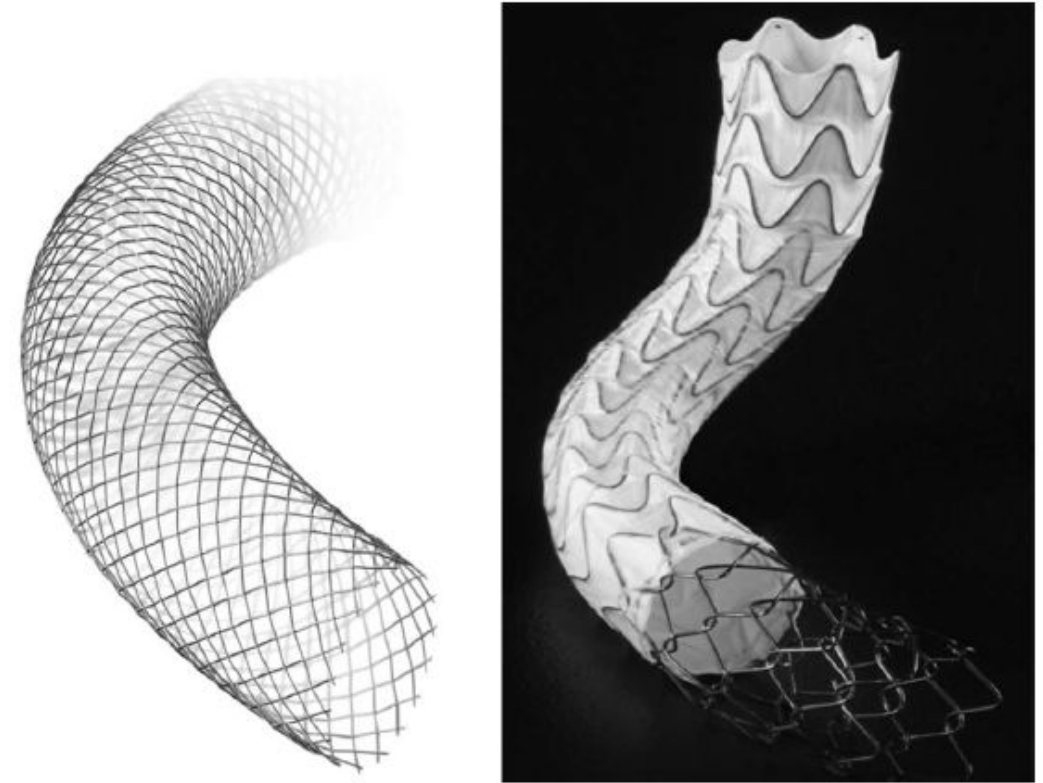
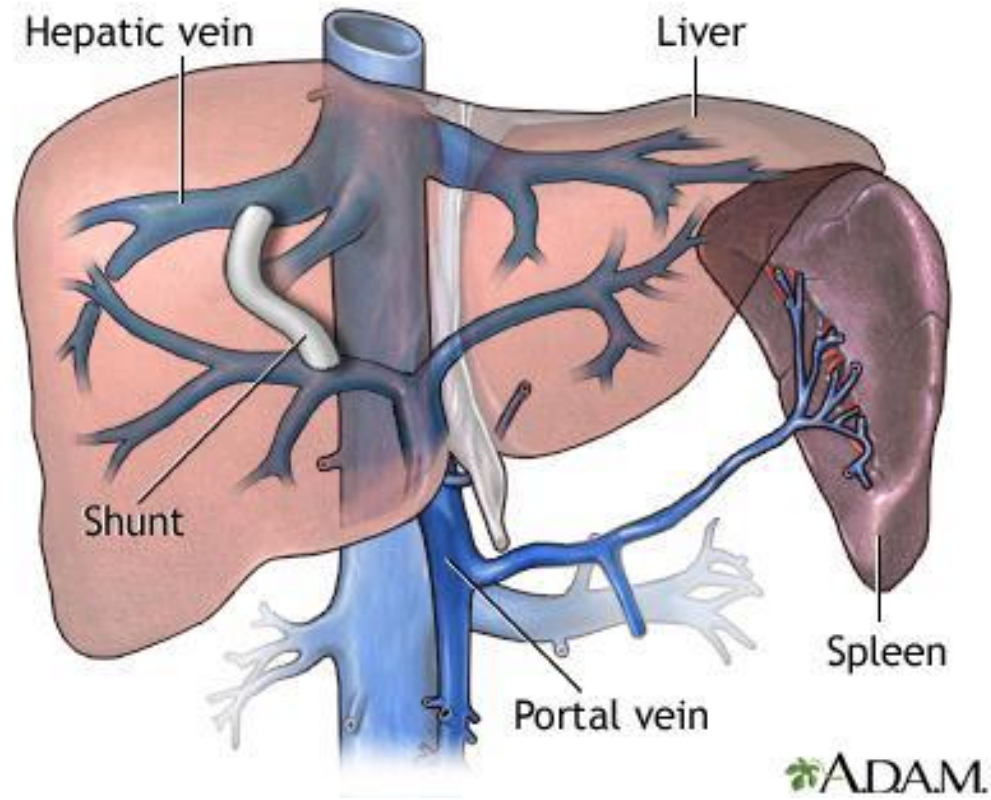


Fig. 3 Bare (left) and covered (right) stents used in TIPS placement

Indications and Contraindications for TIPS

Table 3 Indications and contraindications of TIPS insertion

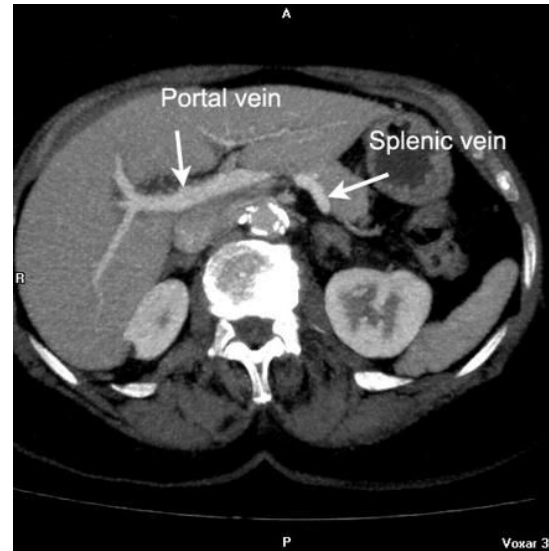
<i>Indication for TIPS</i>
Patient requires >2 paracenteses per month
Patient develops loculated ascites
Patients intolerant of repeated paracentesis
Refractory ascites associated with hepatic hydrothorax
<i>Patient Selection</i>
Young (<65 years)
Normal cardiac, renal function
No prior history of encephalopathy
Child-Pugh score <12, MELD <18
No sepsis, including dental sepsis

<i>Contraindications</i>	
<i>Relative</i>	<i>Absolute</i>
Age >70 years	Child-Pugh ≥ 12 or MELD ≥ 18
Hepatoma	Congestive cardiac failure
Portal vein thrombosis	Severe pulmonary hypertension
Non-compliance with sodium restriction	Unrelieved biliary obstruction
	Untreated infection or uncontrolled sepsis
	Multiple hepatic cysts

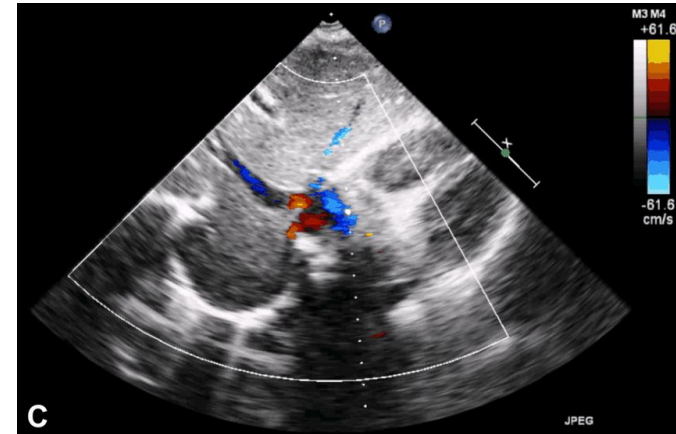
Pre-op Work-up for TIPS



MELD Labs



Imaging



Echocardiogram

TIPS – When do they fail?

- > 65 years of age
- Hypotensive
- High MELD (> 15)
- History of encephalopathy
- Very low gradient post TIPS
- Large caliber

Table 2 Risk factors for the development of hepatic encephalopathy post-TIPS insertion

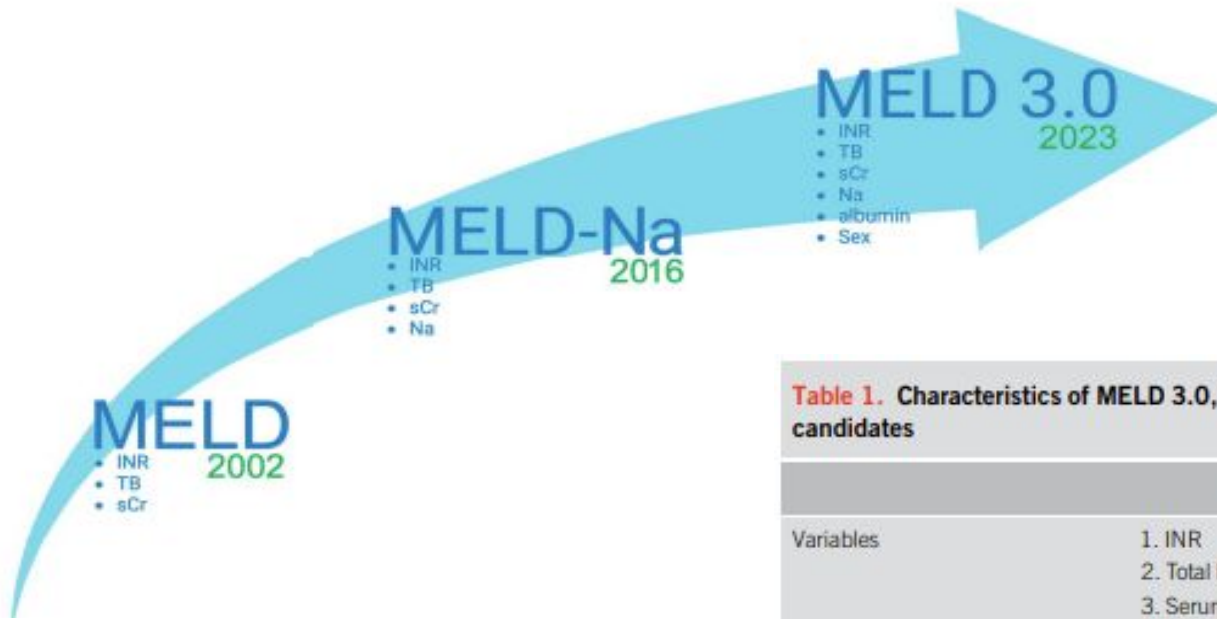
Risk factors for post-TIPS encephalopathy:

1. Age over 65
2. Low-arterial pressure (Mean arterial pressure <80 mmHg)
3. MELD score >15
4. Child-Pugh score >12
5. HE prior to TIPS insertion
6. Low PSPG post-TIPS insertion of <5 mmHg
7. Large diameter stent of >10 mm

Adapted from refs. (57,59,68)

What is MELD vs. MELD Na vs. MELD 3.0?

Characteristics of MELD 3.0, MELD-Na, and Conventional MELD prognostic scores derived from US liver transplant waitlist candidates



MELD – mortality from TIPS

MELD 3.0 – Liver transplant scoring

Table 1. Characteristics of MELD 3.0, MELD-Na, and Conventional MELD prognostic scores derived from US liver transplant waitlist candidates

	MELD 3.0 (2023)	MELD-Na (2016)	Traditional/conventional MELD (2002)
Variables	<ol style="list-style-type: none"> 1. INR 2. Total bilirubin 3. Serum creatinine 4. Serum Na 5. Albumin 6. Sex 	<ol style="list-style-type: none"> 1. INR 2. Total bilirubin 3. Serum creatinine 4. Serum Na 	<ol style="list-style-type: none"> 1. INR 2. Total bilirubin 3. Serum creatinine

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Questions About the Case...

1. How do you treat the patient's ascites with the elevation in Cr?
2. Could this patient ever be a candidate for a TIPS?
3. What else would you be concerned about if this patient had a fever?



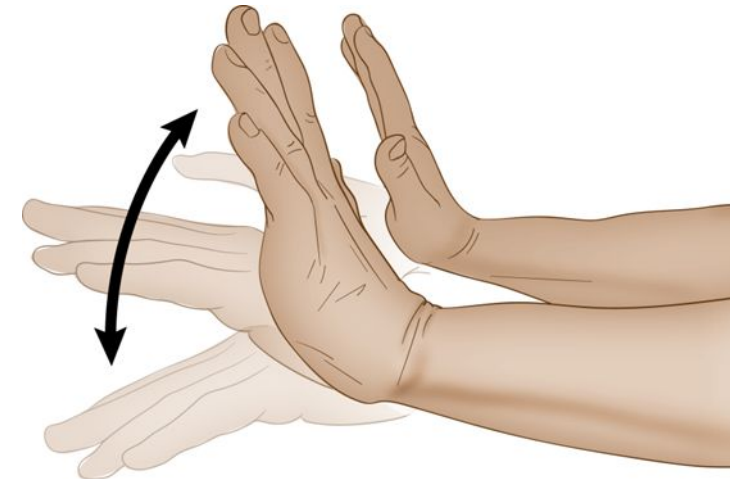
Hepatic Encephalopathy

Case Presentation

- 64M with history of NASH cirrhosis
- Presents to hospital for **fourth time in 6 months**
- Recurrent hepatic encephalopathy
- No signs of infection
- Meds – Lactulose, Rifaximin, Furosemide, Spironolactone
- PE – P – 81, T – afebrile, BP – 112/73, Neuro + asterixis
- Labs – WBC – 8, Hgb – 9.4, Plts – 78, Na – 134, Cr – 1.2, T. Bili – 2.1, INR – 1.4

Stages of Hepatic Encephalopathy

- Stage I
 - ❑ Mild confusion, day night reversal, altered mood, no asterixis
- Stage II
 - ❑ Drowsy, inappropriate behavior, + asterixis
- Stage III
 - ❑ Extremely drowsy, barely able to speak and obey simple commands
- Stage IV
 - ❑ Coma, sometimes able to respond to painful stimuli



Hepatic Encephalopathy Treatments

- Lactulose/Lactitol
 - Non-absorbable disaccharides
- Antibiotic therapies
- Branched chain amino acids
- L-ornithine-L-Aspartate
- Zinc

Lactulose Challenges

- Medication non-compliance
- Socially limiting diarrhea
- 30% of patients develop:
 - Aversion to taste
 - Anorexia
 - Uncontrolled flatulence
 - Abdominal discomfort and bloating
- Lactilol powder could be better tolerated – insurance coverage?
- Is Miralax better tolerated – less distention?

HE – Potential Causes

- Important to determine underlying cause:
 - Hypovolemia
 - GI bleed
 - Sedatives, tranquilizers
 - Infection
 - Porto-systemic shunting – TIPS, SRS
 - Vascular occlusion (new PVT?)

Antibiotic Therapies - Rifaximin

- Low systemic absorption – 0.4%
- Overall Rifaximin shows:
 - ❑ Higher compliance
 - ❑ Fewer hospitalizations
 - ❑ Shorter length of stay
 - ❑ Fewer side effects



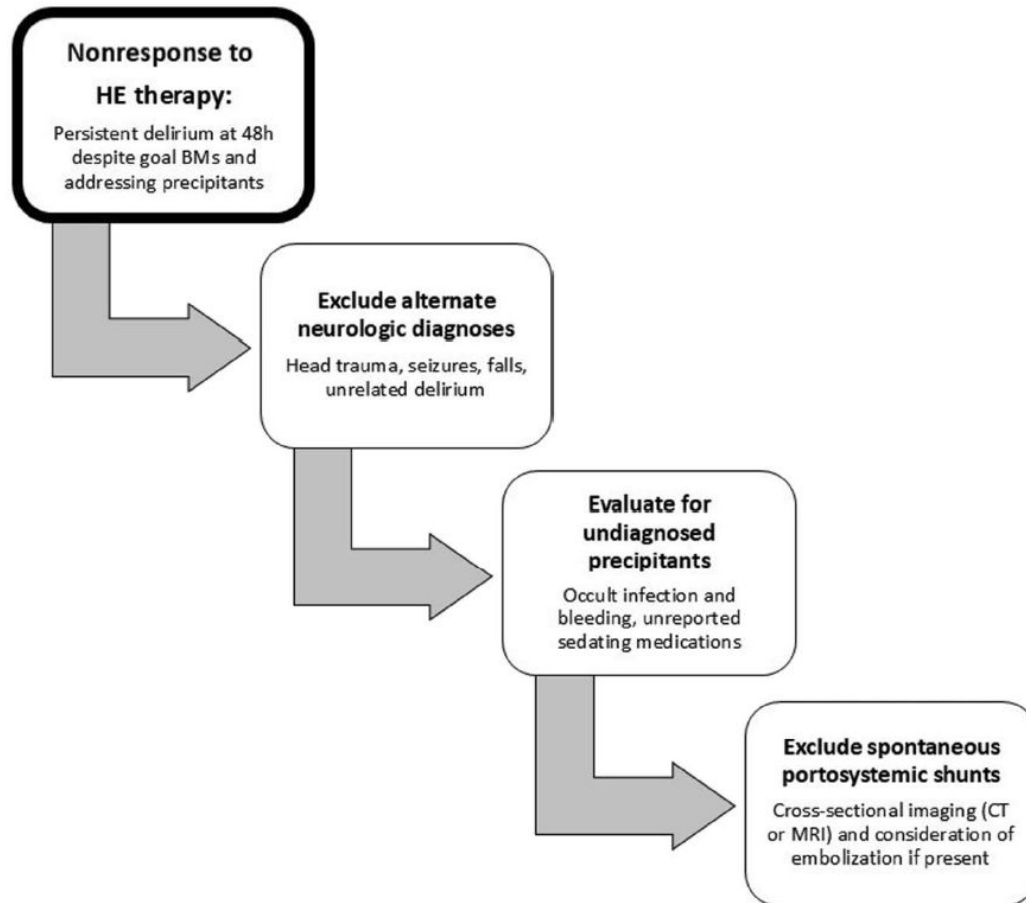
Hudson et al., European Journal of Gastro Hep (2019) 31(4), 434–450.

Ammonia Levels – Not useful!

- Nicolao et al., 2003
 - ❑ 17 patients followed with HE resolved
 - ❑ Ammonia levels did NOT decrease
 - ❑ Some levels increased with HE resolution
- Conclusion
 - ❑ Ammonia levels limited use for diagnosis or clinical management
- Kundra et al., 2005
 - ❑ Evaluated 20 patients with cirrhosis
 - ❑ Stage II mean ammonia level - 72.3
 - ❑ Stage III mean ammonia level - 58.7
 - ❑ Stage IV mean ammonia level - 42.0
- Conclusion
 - ❑ Ammonia levels - No utility in diagnosis of HE

Nicolao et al., *Journal of Hepatology*, 2003, 38, 441-446.
Kundra et al., *Clinical Biochemistry*, 2005, 38, 696-699.

If Lactulose and Rifaximin are not Enough?



- Exclude neurological diseases
- Evaluate for precipitants
 - Infection
 - Bleeding
 - Medications
- Exclude spontaneous shunts
 - Cross sectional imaging
 - May need IR intervention to close off shunts

Bajaj JS, et al. ACG Clinical Guideline: Hepatic Encephalopathy. Am J Gastroenterol. 2026 Mar 1;121(3):588-618.

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Questions About the Case...

1. Next step for recurrent confusion?
2. Other laxative agents that can be used?

Take Home Points

▪ Recognize Cirrhosis

- ❑ Physical Exam
- ❑ Assessing for Decompensation
 - *GI bleeding*
 - *Ascites*
 - *Hepatic Encephalopathy*
- ❑ Clinically Significant Portal Hypertension

▪ Varices

- ❑ Coreg is useful with new guidelines
- ❑ EGD to risk stratify
- ❑ Band Ligation
- ❑ TIPS for severe cases
- ❑ Hepatic encephalopathy after TIPS is possible

Take Home Points

▪ Refractory Ascites

- ❑ Use of albumin with LVPs
- ❑ Indications for TIPS
- ❑ Labs, Imaging, Echo
- ❑ Predictors of TIPS failure
- ❑ MELD predicts TIPS mortality

▪ Hepatic Encephalopathy

- ❑ Stages of HE
- ❑ Lactulose and Rifaximin
- ❑ Medication compliance
- ❑ Ammonia levels not useful
- ❑ Consider imaging for shunts

Questions?

